

CLEARY, GOTTlieb, STEEN & HAMILTON
1250 CONNECTICUT AVENUE, N. W.
WASHINGTON, D. C. 20036
(202) 828-3000

March 1, 1982

COMMENTS OF VENTRON, A DIVISION
OF THICKOL CORPORATION, ON
APPLICATION NO. 81-606-J1

Ventron opposes issuance of a permit for the dredging activity proposed by the State of New Jersey in Application No. 81-606-J1, for a reach of Berry's Creek north of the Route 3 Bridge in Bergen County, New Jersey. The reasonably foreseeable detriments arising from the proposed work far outweigh the benefits, if any, that might be expected to accrue from dredging.

I. INTRODUCTION

The New Jersey Department of Environmental Protection ("NJDEP") proposes to dredge approximately 175,000 cubic yards of bottom sediment from Berry's Creek. The plan contemplates dredging a 12,000 foot reach of the Creek to remove four feet of sediment and other material. The dredged spoil would be placed in a disposal site ("the Velsicol tract") adjacent to the Creek. The object of the dredging is to remove mercury contaminated sediment from the Creek bed. A site map of the area is set out as Figure 1 below:

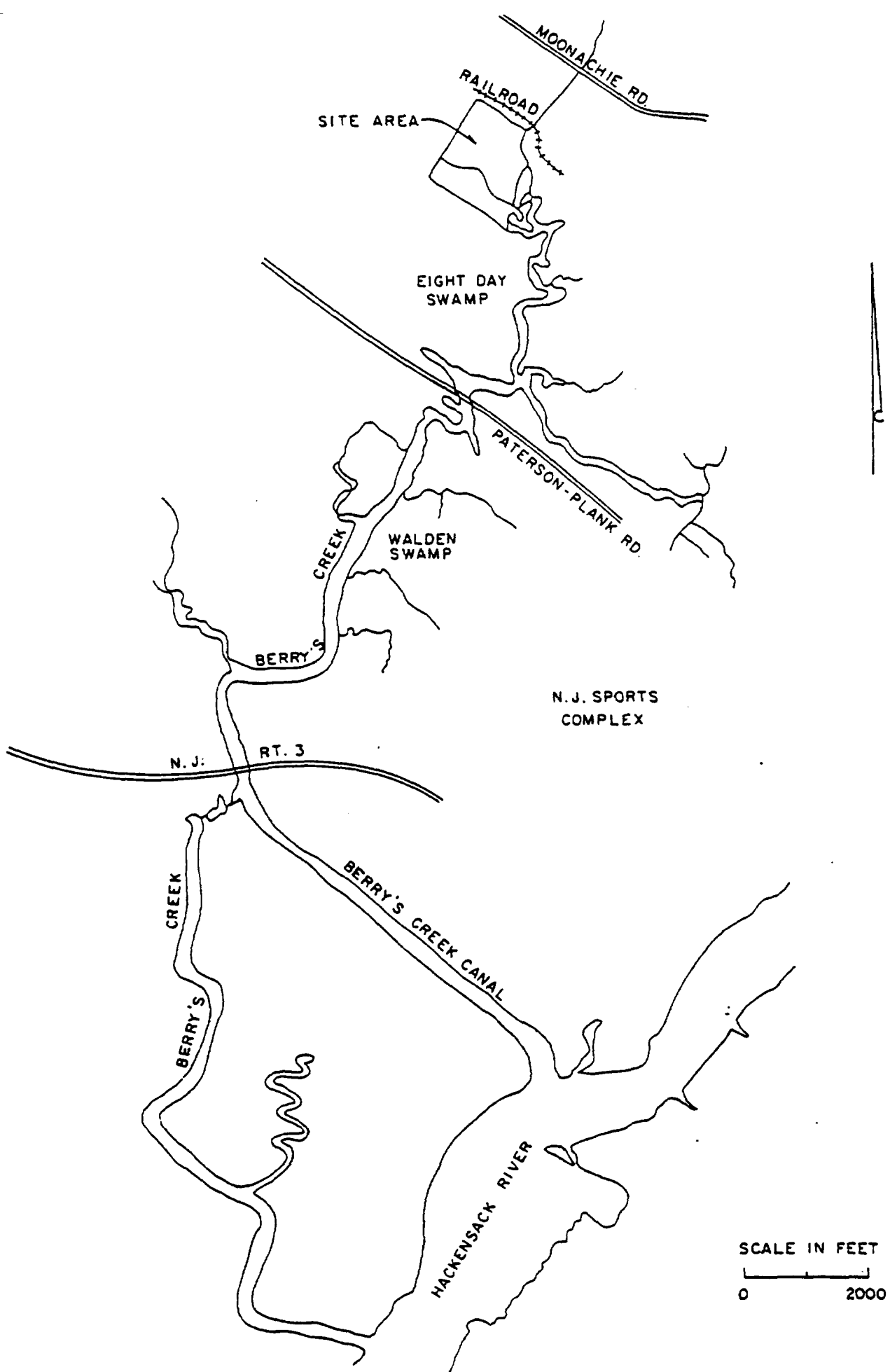


Fig. 1 LOCATION OF BERRY'S CREEK SITE

823370002

The proposed dredging work is an outgrowth of litigation begun in 1976 by New Jersey against Ventron and other defendants, all either former or present owners of a mercury processing plant adjacent to Berry's Creek. The State alleged that wastewater containing mercury had been discharged into the waters of the Creek in violation of State statutory and common law. In the summer of 1978, the case was tried for fifty-five days. On November 15, 1979, the trial judge entered an Order and Judgment finding that the discharges from the plant had violated statutory law and also constituted a common law nuisance.^{1/} The court ruled that the former owners of the plant were strictly liable for certain remedial measures.

As a remedy, the court prescribed the cleanup of Berry's Creek. In the court's view, the cleanup work would focus on the stream bed. Subsequent monitoring would be undertaken to determine whether additional remedial action would be necessary. This remedy had not been requested by the State and was apparently conceived by the court as a means to aid the State in proving what the State had failed to show at trial, i.e., the State did not demonstrate that mercury was leaching

^{1/} The trial court's decision was affirmed in relevant parts, and modified in other respects, by the Appellate Division of the Superior Court on December 9, 1981. New Jersey v. Ventron Corp., et al., Nos. A-1395-79, A-1432-79, A-1446-79 and A-1545-79 (Super Ct. App. Div., Dec. 9, 1981). This decision is presently before the New Jersey Supreme Court on a petition for discretionary review.

from the old plant site and the Velsicol tract into Berry's Creek:

The idea of cleaning up of the stream bed was, in the main, the Court's. The purpose in the Court's mind was to create a Berry's Creek which could be monitored for a period of time to see whether mercury was leaching from the defendants' property. The dredging of the Creek was not the remedy, but merely a preliminary step to assure the remedy to be achieved.

(Letter Opinion, New Jersey v. Ventron Corp., et al., Docket Nos. C-2996-75, C-1954-77, C-1110-78 (August 28, 1980).)

The court's order directed the State of New Jersey to prepare and submit a plan for the cleanup of Berry's Creek "by dredging or otherwise." (Order & Judgment dated Nov. 15, 1979, at ¶ 6(a).)

In formulating a cleanup plan, the court's order expressly directed the State to consider actions other than dredging of Berry's Creek. However, there appears to be nothing in the record of this permit proceeding evincing compliance by the State with the court's order to consider alternative remedies. Indeed, subsequent to the court's judgment, the State submitted a dredging plan to the court, similar to the proposal being made here, to the exclusion of other appropriate and available measures.^{2/}

^{2/} The State evidently fixed on the idea of dredging as early as December, 1978, and since that time has never deviated from its original plan. A memorandum from Chet Mattson of the Hackensack Meadowlands Development Commission to Glen Paulson of the State of New Jersey Department of

(Footnote continued)

The trial court considered the comments of Ventron and Velsicol Chemical Corp. ("Velsicol"), another defendant in the litigation, both of which criticized the technical adequacy of the State's plan. Thereafter, on November 18, 1980, the court issued a supplemental Procedural Order Involving Remedy. The court did not endorse the State's plan. Instead, it simply approved the submission of the plan to the Corps of Engineers without addressing any of the factual issues that had been raised. The court specifically preserved the right of the defendants to object in the Corps proceedings "to the scope or impact of said plan" and to present alternatives to the Corps. The court has, in effect, left it to the Corps to decide what remedial action, if any, should be taken in Berry's Creek.^{3/}

(Footnote continued from previous page)

Environmental Protection, dated December 4, 1978 (attached as Addendum A), reveals that certain New Jersey State officials began to consider a plan to dredge Berry's Creek as much as a year before the trial court issued its Order and Judgment requiring the State to prepare a cleanup plan. The Mattson memorandum contains a proposal for the cleanup of Berry's Creek based on a rudimentary dredging operation developed hastily after a walking tour of the Berry's Creek area by persons not at all expert in the handling of contaminated sediment.

^{3/} At a conference on Mercury in the Berry's Creek Ecosystem held in November, 1980, Ronald Heksch, the attorney for the State of New Jersey in charge of the litigation, similarly took the view that the Corps, rather than the court, would decide the advisability of dredging. "My feeling is whether to dredge or not is something that is ultimately going to be decided by the Corps." Transcript of Proceedings, Mercury in Berry's Creek Ecosystem Conference (Nov. 3 and 4, 1980) ("Conference Transcript"), Vol. 2 at 59.

(Footnote continued)

For the reasons stated below, Ventron opposes the State's proposed dredging of the Creek. The State's proposal is an ill-considered plan without a sufficient factual predicate. These comments (1) discuss the deficiencies in the State's plan, which are so severe that the State's proposal is difficult even to evaluate, (2) present a detailed geochemical modeling study of the Creek which simulates actual conditions before dredging and shows that the apparent present-day stable conditions in the Creek would be upset by dredging and that substantial amounts of mercury would be released into the Creek and the Hackensack River Basin, and (3) identifies alternatives to dredging which should be considered.

The Corps' detailed study of conditions in the Creek should focus on alternatives to dredging, including especially the no-action option. Given the prospect of substantial releases of mercury from large-scale dredging, a decision to take no action would be preferable to the State's proposal. Based on the information now available, alternatives, particularly hydraulic controls designed to enhance the stability of the Creek bed, would also appear to be preferable to dredging.

(Footnote continued from previous page)

This conference was sponsored by NJDEP under a grant from the United States Environmental Protection Agency. Indeed, in response to an inquiry as to who would be responsible if the dredging operation destroyed the ecosystem in the Berry's Creek area, Mr. Heksch replied: "The Army Corps. We always blame the feds when we screw up." Id., Vol. 2 at 100.

II. THE STATE'S DREDGING PLAN LACKS A SUFFICIENT FACTUAL PREDICATE

The State's dredging proposal calls for dredging approximately 175,000 cubic yards of bottom sediment from Berry's Creek. The proposal reflects several critical assumptions, none of which appears to have a factual basis. As a result, the State's proposal does not provide the Corps with the factual underpinning necessary for issuance of a permit. In fact, the application is not accompanied by enough information to make a reasoned evaluation of the necessity for dredging. Further, even if dredging were shown to be needed, there is not enough data to make any decision regarding the appropriate scope of dredging.^{4/}

Notably, the State's proposal assumes that four feet of sediment should be dredged uniformly from the sides and bottom over 12,000 linear feet of the Creek. However, the available data do not support the need for work in the Creek over such an extended length or at such a depth.

The limited data presently available with respect to site soils and sediment reveal that the concentration of mercury in sediment varies over the length of the Creek bed. See

^{4/} The data presently available with respect to many parameters of the Berry's Creek ecosystem are deficient, causing one State official to comment that "[t]here are alot of obvious holes" in the data on which the State relies. See Conference Transcript, Vol. 1 at 81 and 121 (remarks of Dr. Ronald Harkov, NJDEP, Office of Cancer and Toxic Substances Research).

"Mercury At The Berry's Creek, Bergen County, New Jersey: An Evaluation Of Potential Hazards Created By Dredging" prepared for Ventron by Woodward-Clyde Consultants (1982) ("Woodward-Clyde Report") at 8-10. Mercury appears to be present in relatively more elevated levels in the sediment found from 400 feet upstream to 3,000 feet downstream of the old outfall location. Id. Thus, it may be more reasonable to consider only this limited portion of the stream bed as the focus of attention for remedial measures. The graph set out in Figure 2 below shows how the concentration of mercury in the Creek sediment varies along the length of the Creek:

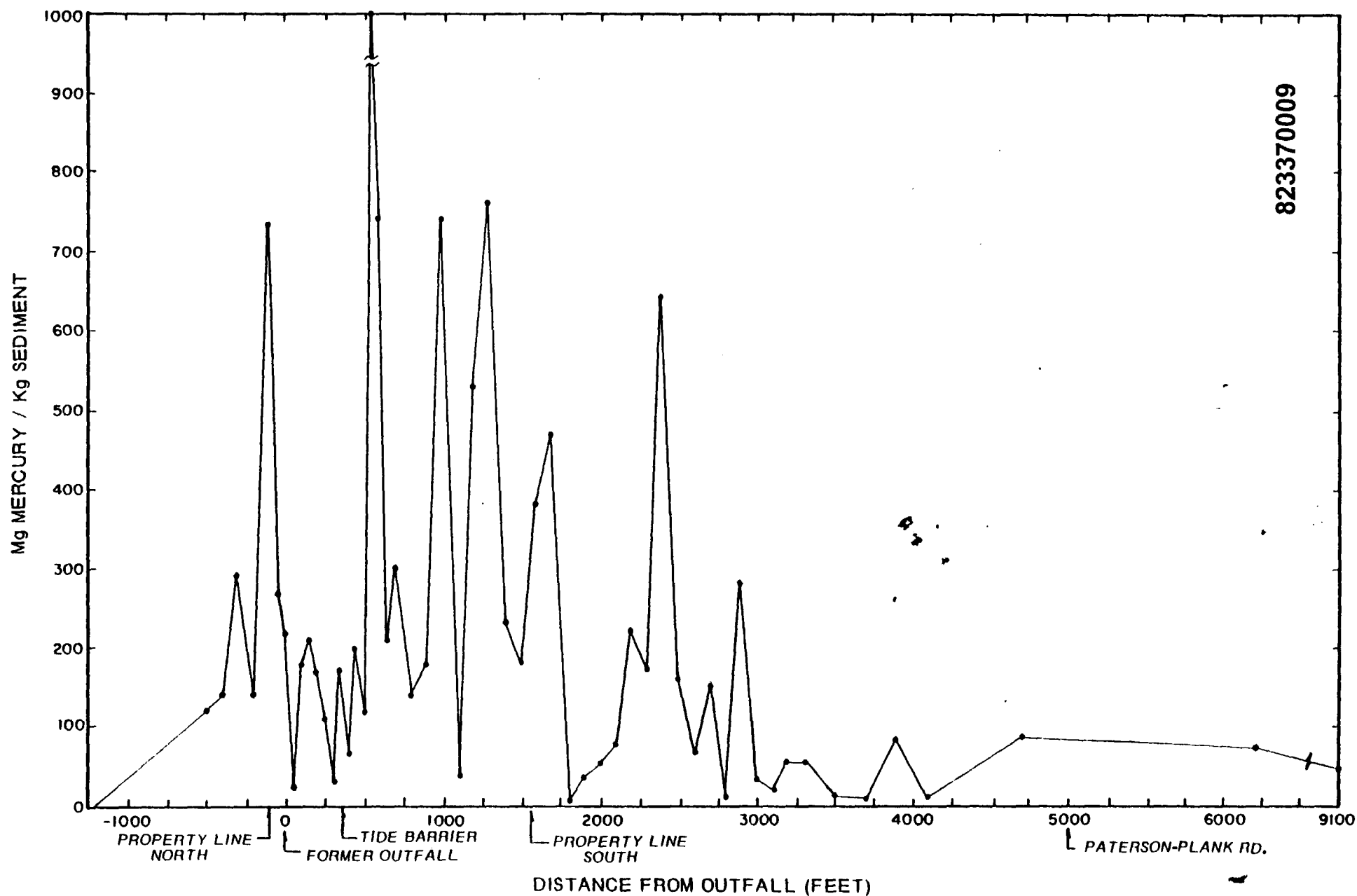


Fig. 2 MERCURY CONCENTRATIONS OBSERVED IN DRY SEDIMENT (mg/kg) IN THE TOP LEVEL OF BERRY'S CREEK SEDIMENT (from AWARE, Inc. Study: Mercury Concentrations In Berry's Creek)

823370009

Moreover, none of the sediment data that are available disclose or relate to conditions in the sediment below a depth of 30 inches. Most of the samples reflect much shallower depths, typically ranging from six to ten inches.^{5/} In addition, no logs of the soil properties encountered in connection with these core samples seem to be available. Perhaps such logs were not made. In any event, there now is no way to correlate the concentrations of mercury found with the type or classification of sediment being sampled. Consequently, no sediment profile can be developed. Overall, the data certainly disclose no basis for assuming that dredging to a depth of 48 inches is warranted. Thus, the proposed four-foot dredging depth is not based on any evidence of contamination to that depth.

The State has, therefore, proposed an extensive and uniform dredging operation without even bothering to identify the extent, location, and depth of the contaminated sediment. Absent such a profile of the Berry's Creek sediment, the State's proposal cannot be realistically evaluated. The lack of such a basic and rudimentary factual predicate to the

^{5/} In response to a request under the Freedom of Information Act ("FOIA"), the Corps of Engineers, New York District, provided Ventron with some limited sediment data derived from samples largely taken at depths of six to ten inches. There may be a preferential zone of adsorption for mercury on organic particles found at certain levels of the sediment. However, the existing sediment data is not sufficient to identify whether any such layer exists.

proposed plan demonstrates that the State's plan is defective at the most fundamental level.

III. THE STATE'S PROPOSAL DOES NOT REFLECT CONSIDERATION
OF THE IMPACT OF DREDGING ON THE PUBLIC INTEREST
OR OF APPROPRIATE ALTERNATIVES TO DREDGING

A. The State Has Failed To Consider The
Effects Of Dredging On Fish And Wildlife
Values And Water Quality Standards

The Corps' regulations and policies for evaluating permit applications require a detailed review to determine the probable impact of the proposed activity on the public interest. 33 C.F.R. Part 320. In reviewing a permit application, "[t]he benefit which reasonably may be expected to accrue from the proposal must be balanced against its reasonably foreseeable detriments." 33 C.F.R. § 320.4(a). The decision of whether or not to issue the permit is determined by the outcome of this balancing test.^{6/} Among the factors that the Corps must consider in making this public-interest determination are fish and wildlife values and water quality. The State's plan, however, makes no mention of these considerations, let alone analyzes the impact the proposed dredging may have on fish, wildlife, and water quality.

The State's permit application makes no reference to the two-day Mercury in Berry's Creek Ecosystem Conference

^{6/} The required balancing of benefits and detriments is discussed in detail infra at 18-35.

sponsored by NJDEP under a grant from the United States Environmental Protection Agency (November 3 and 4, 1980).^{7/} During the Conference, some of the scientists who participated expressed serious doubt concerning the advisability of dredging in Berry's Creek. Participants pointed to potential detrimental effects on fish and wildlife values and water quality. See Conference Transcript, Vol. 2 at 51-59, 103-20.

The State has assuaged none of these concerns. It has not suggested that there would be any improvement in water quality as a result of its proposed dredging operation. It has ignored the potential effects on fish and wildlife in the Hackensack River Basin if dredging were undertaken and substantial amounts of mercury were to be released into the water column of Berry's Creek.

Indeed, with the exception of the State's broad statement that it hopes "to reduce the amount of mercury available for continuous release into the environment and uptake by living organisms," the State's proposal fails to discuss either the benefits or detriments that are reasonably foreseeable if dredging is undertaken. The State, therefore, has apparently chosen to ignore a consideration of the balancing determination that is critical to the Corps' permitting process.

^{7/} See supra, at 5 n.3.

B. The State Has Failed To Consider
Alternatives To Dredging

In evaluating a permit application, the Corps is required to consider "[t]he desirability of using appropriate alternative locations and methods to accomplish the objective of the proposed structure or work." 33 C.F.R. § 320.4(a)(ii). The State's plan, however, fails to discuss a single alternative to the proposed dredging of Berry's Creek.

As early as 1978, the State considered dredging as a means to effectuate a cleanup of Berry's Creek^{8/} and has persisted with a dredging plan since that time despite advice from federal officials regarding alternatives to dredging and adverse comments on dredging. For instance, a letter from Michael V. Polito, United States Environmental Protection Agency, Emergency Response and Inspection Branch, to David Lipsky, New Jersey Department of Environmental Protection, dated October 15, 1979 (attached as Addendum B), indicates that the State was informed of the availability of a number of scientific abstracts dealing with the removal of mercury from stream sediment using methods other than dredging. However, there is no indication in the record that the State of New Jersey ever attempted to secure these publications, or investigated the possibility of using the alternatives suggested in those publications.

^{8/} See supra, at 4 n.2.

Even more significantly, a number of handwritten memoranda circulated among various EPA officials indicate that New Jersey officials were in contact with Dr. Richard Dewling, Director of the Surveillance and Analysis Division of Region II, United States Environmental Protection Agency, on the issue of dredging Berry's Creek, and that Dr. Dewling, who has consistently opposed dredging in the Hackensack Meadowlands area, communicated his opposition to New Jersey officials.^{9/}

Yet, despite the State's awareness that officials at EPA had grave doubts on the advisability of dredging in Berry's Creek, the State has clung tenaciously to a flawed dredging plan with no apparent investigation of alternative proposals for preserving the now-stable conditions in Berry's Creek.^{10/}

In fact, in response to an item on the permit application asking the State to discuss the alternatives to the proposed project that were investigated and to state why they were rejected, the State misleadingly refers the reviewer to page four of the State's Plan for the Clean-up of Berry's Creek

^{9/} See Memorandum from Barbara Metzger to Michael V. Polito through Fred Rubel, dated October 16, 1979 (attached as Addendum C); memorandum by Michael V. Polito, dated October 19, 1979 (attached as Addendum D).

^{10/} One state official participating in the Berry's Creek Conference alluded to some consideration of a few limited alternatives, but the State's proposal neither discusses these plans nor explains why they were rejected. See Conference Transcript, Vol. 1 at 18 (remarks of Dr. David Lipsky, formerly NJDEP, Office of Cancer and Toxic Substances Research).

(Attachment II to the State's Permit Application). The discussion at the referenced page is limited, however, to a nonresponsive discussion of alternative means of dredged spoil disposal. This discussion assumes that dredging will take place and contains no discussion whatsoever of alternatives to dredging.

On the basis of what is known today, taking no action is preferable to the State's large-scale dredging proposal. But, the publications to which New Jersey has referred in its permit application suggest that at least the following alternatives to dredging ought to be considered:^{11/}

1. Covers. The sediment in the Creek bed could be physically covered by a relatively inert material.^{12/} Some materials such as calcium aluminates or lime plus pozzolans including diatomaceous earth and pumicites can harden and form a crust when placed on top of or mixed with bottom sediment. Short gel or set times are usually critical to the success of these measures. Fast-setting Wyoming bentonite-containing

^{11/} Ventron itself does not embrace or advocate adoption of any of these alternatives.

^{12/} Studies have shown that mineral coverings such as sand, gravel, or clay may assist in immobilizing mercury contaminated sediment. See "Control of Mercury Pollution in Freshwater Sediments," prepared for the Office of Research and Monitoring, U.S. Environmental Protection Agency (1972); "Sand and Gravel Overlay for Control of Mercury in Sediments," prepared for the U.S. Environmental Protection Agency (1972).

grouts have been shown to gel rapidly and to have a "marked resistance" to erosion. Grout-pozzolan delivery systems would have to be designed and used with care.

2. Chemical fixation. It may be possible to use a chemical fixation agent or ion-exchange resin to fix the mercury near the surface of the sediment and prevent transfer to the water column. In Berry's Creek, a naturally occurring phenomenon akin to fixation by chemical adsorption may currently be at work -- mercury is known to be preferentially adsorbed on certain types of organic sedimentary materials.^{13/}

3. Hydraulic controls. These measures focus on stabilization of the stream flows to prevent scouring and similar actions that would have the effect of entraining the sediment in the water body. Sediment retention basins involve the creation of small impoundments by dams or berms. These basins control water flow to prevent any scouring of stream beds and act to settle any solids which become entrained or suspended in the stream flow. Tide controls serve a similar purpose insofar as tidal flows are concerned. Berry's Creek currently has a

^{13/} Studies indicate that the mercury-binding capacity of sediment might be increased by the addition of inorganic sulfides such as pyrite (FeS_2), ferrous sulfide (FeS), and sphalerite or zinc sulfide (ZnS), or by the addition of long-chain alkyl thiols. The long-chain alkyl thiols may also be useful in binding methylmercuric ion, and have been shown to be particularly suited to saline or brackish waters. See "Control of Mercury Pollution in Sediments," prepared for the U.S. Environmental Protection Agency (1972).

tide gate just below the old discharge outfall. This tide gate may have acted to limit to some extent the wash of suspended or entrained sediment in the stream.

4. Rechannelization of the stream. Berry's Creek could be rechanneled and the existing stream bed could be filled with the material removed to form the new channel. The sediment to which mercury is adsorbed would be covered and fixed by the fill and protected as to groundwater flows by the rechannelization. In conjunction with any rechannelization operation, it might be desirable to use a fixing agent of the type described above, for the purpose of ensuring that sediment containing mercury would remain in place. Any channel probably would be cut west of the existing stream bed through the Velsicol tract and marshland to the south of the tract.

5. Redirecting a portion of the Creek to a pipe or conduit. The flow of the Creek in the area of contaminated sediment could be redirected to a pipe or conduit. This option would serve many of the same purposes of the rechannelization option. Care would have to be taken not to disturb the existing Creek bed.

6. Chemical buffering controls. A factor in the current relative stability of the Creek seems to be the low degree of oxidation of the sediment. Additionally, the naturally occurring sulfate content of the sediment appears to be maintaining well-buffered reducing conditions. Under these

reducing conditions, mercury remains in insoluble forms. It may be possible to enhance these conditions by chemical buffering. On the other hand, these naturally occurring sulfate-buffered conditions seem to be working quite effectively, and it may be wise to leave well enough alone.

IV. DREDGING IN ACCORDANCE WITH THE STATE'S
PROPOSAL FAILS TO SATISFY THE CORPS' BALANCING
TEST BECAUSE IT WOULD INCREASE THE RISK OF HARM
AND NOT CLEAN UP THE CREEK

The available data reveal that there are, at present, no currently extant or imminent harms from the mercury in the sediment in Berry's Creek and that these conditions are likely to remain stable in the absence of a significant perturbation such as dredging. A geochemical modeling study of the conditions in Berry's Creek indicates that dredging may, in fact, create a serious environmental hazard. Accordingly, no action seems to be a better alternative by far. If necessary, other alternatives used to enhance and preserve the now seemingly stable conditions of the Berry's Creek ecosystem may be preferable to dredging.

A. Conditions In The Berry's Creek
Ecosystem Are Not Presently Causing
Harm Or Threatening To Cause Harm

Although the information available with respect to mercury contamination in Berry's Creek is sparse,^{14/} data drawn

^{14/} See supra at 6-8.

from previously conducted monitoring activities in the area do permit some conclusions to be drawn concerning existing conditions.

Most of the mercury currently appears to be bound to sediment that has settled in the bottom of Berry's Creek and the adjacent marshes. See Woodward-Clyde Report at i. As a result, portions of the Berry's Creek ecosystem appear to be relatively free of mercury contamination.

1. Water quality.

All of the filtered surface water samples taken from Berry's Creek contain less than 5 ppb mercury, New Jersey's minimum allowable concentration of mercury in surface water. See Woodward-Clyde Report at 8. Similarly, in a collection of 176 unfiltered samples made by the Hackensack Meadowlands Development Commission ("HMDC"), only 7 samples collected from Berry's Creek exceeded the 5 ppb standard. See Mercury Levels in Berry's Creek, prepared by NJDEP, Office of Cancer and Toxic Substances Research (1980) (Attachment II to the State's Permit Application) ("NJDEP Report") at 14. Indeed, although mercury concentrations in surface water in Berry's Creek slightly exceed levels found in other parts of the Meadowlands, the average monthly mercury concentrations in the surface waters of Berry's Creek, according to the HMDC study, were below the 5 ppb standard for all but one month. See Id. at Fig. 10a. Mercury concentrations in surface waters of the Meadowlands

excluding Berry's Creek similarly exceeded the 5 ppb standard in the same month. See Id. at Fig. 10b; Conference Transcript, Vol. 1 at 119-20 (remarks of Dr. Ronald Harkov, NJDEP, Office of Cancer and Toxic Substances Research).

The relatively low levels of mercury in the water column of Berry's Creek may, in part, be the result of mercury's presence in insoluble forms plus its high affinity for adsorption on suspended solids, especially organic matter. See Conference Transcript, Vol. 1 at 117-18 (remarks of Dr. Harkov); Woodward-Clyde Report at 6. Further, most of the mercury compounds presently existing in the sediment have low water solubility which minimizes the amount of dissolved mercury in the water. Indeed, the HMDC study revealed that levels of dissolved mercury were below detectable levels in and around Berry's Creek. NJDEP Report at 14; Conference Transcript at 118 (remarks of Dr. Harkov).

Thus, it would appear that the water quality of Berry's Creek is normally within the standards set by the State of New Jersey with insignificant levels of dissolved mercury present.

2. Mercury levels in biota.

The current United States Food and Drug Administration tolerance level for mercury in edible fish flesh is 1.0 ppm. The NJDEP has accepted this standard as "a useful yardstick to determine when levels of contamination may be

approaching unsafe levels not only in edible fish but in other species as well." NJDEP Report at 17.

NJDEP has funded several studies of the Berry's Creek area with respect to mercury levels in terrestrial organisms (mammals and birds) and aquatic organisms (fish) believed to be resident in the Berry's Creek area. The studies have shown that although the mercury levels in the studied organisms are slightly above-average, they are below the FDA standard of 1.0 ppm. See NJDEP Report at 17; Conference Transcript, Vol. 1 at 103-04 (remarks of Dr. David Lipsky, formerly NJDEP, Office of Cancer and Toxic Substances Research). Indeed, one NJDEP official has remarked, with respect to the results of these studies, "when we look at some of the data from other parts of the State you would be hard pressed to be able to quickly spot this area as being one of excessive mercury pollution." Id. at 103 (remarks of Dr. Lipsky).

Data derived from studies of vegetation in the Berry's Creek area are particularly sparse, but only slight differences have been observed between mercury concentrations in plant tissues collected from heavy and light mercury soil contamination areas. NJDEP Report at 20; Conference Transcript, Vol. 1 at 104 (remarks of Dr. Lipsky).

Thus, although NJDEP suggests further monitoring of mercury contamination in biota, to date unacceptable levels of mercury contamination in the biota of the Berry's Creek area have not been found.

3. Air quality.

Two studies conducted by EPA to determine the level of mercury in the ambient air at Berry's Creek have revealed an average daily level of $3.3 \mu\text{g}/\text{m}^3$. The World Health Organization has determined that no demonstrable health effects can be shown for occupational exposure in workers inhaling approximately the equivalent of $15 \mu\text{g}/\text{m}^3$ 24 hours a day over the period of a year. NJDEP Report at 16.^{15/}

These data have led NJDEP to conclude, with respect to mercury levels in the ambient air, that "the levels are not high enough to indicate any immediate health threat to either nearby residents or workers." NJDEP Report at 16. See also Conference Transcript, Vol. 1 at 125-126 (loss of mercury from Berry's Creek area via vaporization is probably insignificant) (remarks of Dr. Harkov).

4. Health effects.

In 1979, the New Jersey Department of Health conducted an epidemiological study of residents living in the vicinity of Berry's Creek and employees who worked in the area, taking hair, blood and urine samples. Based on an analysis of the blood and urine samples, the Department of Health concluded that, based on current conditions, there is no health hazard

^{15/} This 24-hour equivalent was extrapolated from a Threshold Limit Value ("TLV") which has an 8-hour basis.

presented to humans who live or work in the vicinity of Berry's Creek. See NJDEP Report at 20-21; Conference Transcript, Vol. 2 at 37.

B. The Current Conditions In The Berry's Creek Area Are Stable And May Remain Stable Indefinitely

The State of New Jersey agrees that there is no evident harm or immediate health hazard presented by the presence of mercury in the bottom sediment of Berry's Creek based on data with respect to air and water quality, mercury levels in biota, and health data. See NJDEP Report at 1; Conference Transcript, Vol. 2 at 61 (Remarks of Ronald Heksch). Nonetheless, the State proposes to dredge the bottom sediment from Berry's Creek. While the court wanted the Creek cleaned up to be able to monitor for possible leaching from the old plant site and the Velsicol tract, the State seemingly has adopted a new rationale. The State's proposal appears to be based on speculation that conditions may, at some point in the future, change to cause harm or create a hazard.

In a 1980 report prepared by officials of NJDEP ("Mercury Levels in Berry's Creek"), the State explained its concerns with respect to future events:

Despite the heavy contamination in the Berry's Creek ecosystem, the aquatic organisms continue to be within acceptable federal standards for mercury contamination. Organisms with higher levels than found in Berry's Creek can be found in areas of lesser or no known mercury contamination. Because of the chemical,

physical, and biological properties of mercury, it is the Department's position that mercury levels in aquatic organisms might rise rapidly in the future should water quality conditions in Berry's Creek change.

(NJDEP Report at 21 (emphasis added). See also Conference Transcript, Vol. 1 at 18-19 (remarks of Dr. Lipsky).)

Further, at the Berry's Creek Conference, an additional concern of State officials emerged, i.e., that a major storm event might mobilize the mercury now collected in the bottom sediment. See Conference Transcript, Vol. 1 at 73-74; Vol. 2 at 17; Vol. 3 at 34-36.

Both of these concerns, the improved-water-quality theory and the big-storm theory, were discussed by the participants at the Berry's Creek Conference.

1. Improved-water-quality theory.

At the Conference, Dr. Lipsky described the improved-water-quality theory as a situation in which a diverse biological community might develop in the now sparsely populated area of Berry's Creek as sewage treatment plants improve the water quality to levels where aquatic organisms would be able to survive. This theory posits that the improved water quality might increase the mobilization of mercury now present in the sediment. Conference Transcript, Vol. 1 at 18.

The possible adverse effect of improved water quality is said to arise from the potential for the transformation of

mercury from its elemental and inorganic forms, presently the predominant forms in the bottom sediment, to an organic form, methylmercury. Unlike mercury in elemental or inorganic forms, methylmercury is highly toxic to humans and is readily absorbed by biological organisms. There is presently no significant methylation occurring at the Berry's Creek site. See Conference Transcript, Vol. 2 at 104-05 (remarks of Dr. Wood); Woodward-Clyde Report at 14. A change in factors such as pH, oxidation-reduction potential, nutrient loadings or sedimentation rates could, however, alter the rate of methylation. See NJDEP Report at 9-10. For example, the current levels of mercury and other metals in the bottom sediment appear to inhibit the growth of bacteria that convert mercury to the toxic methyl form. If these bacteria could somehow increase, the theory goes, arguably a more efficient conversion to methylmercury could occur. Woodward-Clyde Report at ii.

Participants in the Berry's Creek Conference have responded to this improved-water-quality theory by raising two critical points: first, organisms (such as bacteria) that can methylate mercury may be inhibited in the area of the contaminated sediment because of the concentration of mercury; and second, high concentrations of sulfate in the marshes provide a natural mechanism that inhibits formation of methylmercury.^{16/}

^{16/} For a brief description of the naturally occurring sulfate interactions as they relate to alternative remedial measures, see supra at 17 (chemical buffering).

See Conference Transcript, Vol. 2 at 104-106 (remarks of Dr. Wood). As a result, there would appear to be little likelihood that increased methylation will occur naturally by virtue of improved water quality values:

Now, if you look at all the organic material that you have in the sediments already built up from many sources, the sewerage treatment plants and elsewhere and you combine this with the flushing in and out of the tide, then the odds are that this particular situation will remain stable for a long, long time.

(Conference Transcript, Vol. 2 at 106 (remarks of Dr. John Wood, Freshwater Biology Institute).) See also Transcript, Vol. 2 at 112-13 (remarks of Dr. D'Iltiri); Vol. 3 at 7 (remarks of unidentified speaker).

One participant relied on data concerning mercury deposited in San Francisco Bay during the Gold Rush era. An enormous quantity of mercury settled to the bottom of the Bay and has remained stable and nonthreatening since its deposition in the mid-nineteenth century. See Conference Transcript, Vol. 2 at 109-10 (remarks of Dr. Wood).

The Woodward-Clyde Report, prepared for Ventron, similarly concludes that conditions unfavorable to the formation of methylmercury are likely to remain stable absent a significant perturbation such as dredging. See Woodward-Clyde Report at ii, 12-14, 17.

Thus, there is significant authority for the fact that the current nonthreatening conditions will remain stable

indefinitely despite improved water quality. The State, to our knowledge, has neither collected nor presented any data to the contrary and appears to rely on pure conjecture for the proposition that a future hazard may occur.

2. The big-storm theory.

Although the big-storm theory received less scientific analysis, participants at the Berry's Creek Conference also addressed this concern. The major concern in the big-storm scenario is that the mercury in the bottom sediment would be stirred up, releasing mercury to the surrounding biosphere. A group of scientists who focused on this issue, however, concluded on the basis of information presently available that there would possibly be little net loss or gain of mercury from Berry's Creek in a storm event. See Conference Transcript, Vol. 3 at 34-35 (remarks of unidentified speaker). The possibility of a major storm transporting mercury from Berry's Creek was determined to be remote. In fact, such a catastrophic storm was termed "unbelievable." Such a storm would have to be powerful enough to move cars, destroy homes, and level major portions of the Meadowlands Sports Complex. Conference Transcript, Vol. 3 at 58-59.

Thus, the big-storm theory proves too much. A storm big enough to cause transport of the mercury in the sediment of the Creek would virtually destroy the Meadowlands themselves.

3. Further evidence of current stability.

The State of New Jersey has also raised the concern that

the action of physical and biological process can result in the transport of mercury in a relatively non-toxic form and from zones of relative environmental isolation (such as tightly bound to soils) to areas where microorganisms and other biota can transform the mercury into methylmercury.

(NJDEP Report at 10.)

However, New Jersey officials at the Conference described a tidal penetration pattern that appears to be holding the mercury in the Berry's Creek basin. Conference Transcript, Vol. 1 at 31 (remarks of Mr. Chester Mattson, HMDC). Indeed, the entire Hackensack River system appears to retain pollutants and prevent their transport into Newark Bay and further. Id. at 35-36 (remarks of Mr. Mattson). Moreover, an NJDEP official reported that, in his opinion, "the mercury at the site was confined to the site and not getting into the lower aquifers." Id. at 49 (remarks of Mr. Hutchinson).^{17/}

^{17/} One participant at the Berry's Creek Conference hypothesized that under current tidal flow and water circulation conditions, metallic sediment from the Hackensack River was being deposited in Newark Bay near the mouth of the Passaic River. Conference Transcript, Vol. 1 at 91 (remarks of Dr. Lee Meyerson, Kean College). This interpretation and the sparse data on which it was based were severely criticized by several participants, including Dr. Dennis Suszkowski of the Army Corps of Engineers. Id. at 91-92.

Again, mercury is present in the water column of Berry's Creek at levels below the water quality standard.

Thus, based on currently available data, it appears that the present nonthreatening conditions at Berry's Creek are, as a result of naturally occurring phenomena, stable and likely to remain so. Further, the mercury contamination appears to be confined to the sediment in Berry's Creek as a result of normal tidal penetration features.

C. Dredging May Pose Serious Hazards That Do Not Exist Under Current Stable Conditions

While the supposed benefit of dredging Berry's Creek would appear to be the avoidance of some speculative, future hazard, the detriments associated with dredging have a clear factual basis. These detriments are not discussed in the State's application. That is not surprising since the detriments far exceed the value of any benefits.

1. Increased methylation and mobilization.

As discussed above, the mercury contained in the bottom sediment of Berry's Creek is predominantly found as elemental or inorganic mercury that is tightly bound to organic solids that have settled into the sediment in the creek bed. Mercury may undergo a transformation, under certain circumstances from elemental or inorganic forms to much more soluble forms. These relatively soluble forms can be subject to methylation reactions.

The attached Woodward-Clyde Report notes that dredging may increase the solubility of mercury thereby

increasing the mobility of mercury and the possibility of methylation. Woodward-Clyde Report at 14. The consultants modeled the geochemistry of Berry's Creek using a computer model, GEOCHEM. In an effort to predict the results of dredging, the modeling technique was programmed to assume that bottom sediment was mixed with slightly saline water as might occur under dredging conditions in Berry's Creek. The results indicate that substantial amounts of mercury might become soluble under dredging conditions. This increased solubility would likely increase the mobility of mercury and could cause increased rates of conversion to toxic methylmercury. Woodward-Clyde Report at 14.

A similar conclusion was reached by some participants at the Berry's Creek Conference who noted that methylation and the mobility of mercury are naturally maintained at low rates in the present system of Berry's Creek. Conference Transcript, Vol. 2 at 103-113 (remarks of Dr. Wood, Dr. D'Ilttri). According to Dr. John Wood of the Freshwater Biology Institute, dredging could cause heavily loaded sediment with mercury to be stirred up into particulate material, possibly causing serious hazards to the Berry's Creek area as well as surrounding areas. Id. at 106-108 (remarks of Dr. Wood). Consequently, Dr. Wood commented that he was "terrified about dredging" and recommended sealing off the mercury source and leaving the creek alone. Id. at 113, 119.^{18/}

^{18/} Because of the limited transport of suspended material in the waters of Berry's Creek and the Hackensack River Basin

(Footnote continued)

Federal environmental officials have also expressed serious reservations about the use of dredging as a remedial measure. For example, their concerns with the mobilization of toxic substances in sediment such as polluted sediment in Baltimore Harbor, have led them to investigate alternatives, including fixation techniques and permitting natural recovery processes to proceed. See, e.g., Environmental Protection Agency, Evaluation Of The Problem Posed By In-Place Pollutants in Baltimore Harbor And Recommendation of Corrective Action, at 51-79 (September, 1977).

More recently, a Draft Environmental Impact Statement on Polychlorinated Biphenyls (PCBs) in the Hudson River in New York State (1981), recommended limited dredging in areas of highest contamination but only after a comprehensive evaluation of alternative methods and alternative dredging techniques that reduce the dispersal and loss of PCBs. See Id. at 2-1 through 2-50. Further, unlike the mercury in Berry's Creek, the PCBs in the Hudson presented an immediate threat because the PCBs were being transported downstream by flow conditions and lost to the air by volatilization. In addition, fish species were

(Footnote continued from previous page)

(see supra at 28-29), the mercury placed in suspension by the dredging operation would be likely to spread out in the Hackensack River Basin and not appreciably be carried beyond it. As the GEOCHEM modeling study shows, methylation reactions probably would take place in the Hackensack Basin, and the Basin could be quite adversely affected. Woodward-Clyde Report at 14-17.

contaminated in excess of tolerance levels, causing the closing of a commercial fishery. Id. at 4-2 through 4-8. Most importantly, in discussing the impacts of dredging, the EIS discussed the potential loss of heavy metals, such as mercury, to the water column from dredgehead disturbance of the bottom, and recommended that mercury levels, low in the Hudson River, be carefully monitored during dredging. Id. at 4-44 through 4-45. Thus, it seems clear that Federal officials are well aware of the hazards created by dredging.

2. The presence of other heavy metals.

In addition to the effect that dredging may have on the mercury, risks may be presented by the presence of other heavy metals in Berry's Creek bottom sediment.

According to one official of the Hackensack Meadowlands Commission, a number of metals are found in the sediment of Berry's Creek: chromium, copper, cadmium, nickel, lead and zinc. Conference Transcript, Vol. 1 at 76-78 (remarks of Mr. Galluzzi). In addition, measurable levels of arsenic may exist, id., Vol. 3 at 72 (remarks of unidentified speaker), and there may be PCB contamination in the Creek. Id. at 86-87.

As a consequence of the presence of other chemical elements in the sediment, dredging of the Creek may pose additional hazards beyond those presented by mercury mobilization and methylation. See Id. at 79-90; Vol. 4 at 6-9. Alternatives that would minimize these hazards should also be considered.

3. Other hazards associated with dredging.

A number of other problems associated with dredging should be evaluated with respect to the advisability of refraining from dredging or pursuing alternative remedies.

For example, workers on the dredging operation may be exposed to excessive levels of mercury and other chemicals. According to one participant in the Berry's Creek Conference, worker deaths have occurred in mercury dredging operations in Japan. Conference Transcript, Vol. 3 at 82 (remarks of unidentified speaker). Similarly, exposure to arsenic compounds could pose serious health hazards to workers. Id. at 83 (remarks of unidentified speaker).

Aesthetic damage is also likely. Dredging will create an intense, foul, sulfide odor in the area and the sulfides may cause white paint on houses and buildings in the vicinity to turn black. Id. at 78-79.

Finally, under the State's plan the dredged spoil would be deposited and permanently isolated on the Velsicol tract. A small part of the designated disposal area is wetlands that will be lost permanently. Moreover, the State has concluded that none of the land in the disposal area should be developed in the future. See Plan for the Cleanup of Berry's Creek, at 3 (Attachment II to the State's Permit Application). Thus, the proposed dredging plan will involve the loss of upwards of 18 acres of land that might otherwise be put to productive use.

In summary, dredging is a drastic remedy that poses serious hazards to health and the environment. There appears to be no reason to upset the stable conditions now appertaining in the Creek. No action seems preferable to dredging. If necessary, other alternative remedial measures should be examined closely.

4. Alternatives to dredging may be preferable.

At a minimum, any work authorized by permit to be undertaken in Berry's Creek should be shown to constitute an improvement over current conditions. The relative stability of the Creek should not be upset unless the benefits of permitted work would outweigh both short-term and long-term detriments. This comparative judgment cannot be made in the absence of an examination of the reasons for the current stability of the Creek ecosystem and of the contributing conditions which might most easily be upset to produce environmental harm. Once the reasons and contributing conditions have been identified, the means of maintaining and enhancing the relative stability of the Creek can better be evaluated. As discussed above, in light of what is known now about the Creek's ecosystem, dredging, and especially large-scale dredging, appears to be one of the least desirable courses of action. A number of other options, including no action, should, therefore, be the subject of detailed assessment.

Based on currently available information, no action is the most attractive option. If that choice were deemed unacceptable, other options should be proposed such that interested persons may be given an opportunity to examine and evaluate them and submit comments. The most attractive other options are those which would involve the least physical disruption to the Creek bed and thus pose a much lesser danger that mercury now present in sediment could be suspended or dissolved in the water column of the Creek. Hydraulic controls are among these options. They include use of sediment retention basins, tide controls, and actions on Velsicol's 33-acre tract to eliminate the drainage system which now traverses the tract from the old plant site to the Creek. These actions, or a combination of them, would serve the objectives of maintaining the currently stable conditions while avoiding creation of a hazard which is not now present.

CONCLUSION

The application by New Jersey for a large-scale dredging project in Berry's Creek should be rejected. When the adverse effects are considered, it is plain that the dredging work would amount to a planned disaster.

The Woodward-Clyde Consultants' geochemical modeling work regarding the stream conditions which would occur upon dredging shows that considerable amounts of mercury would be suspended or dissolved in the water column of the Creek. The

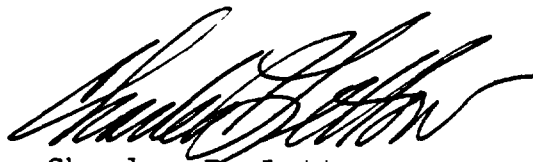
mercury would then be subject to adverse chemical reactions and be changed to forms with increased solubility. Much of this mercury would be transported downstream to portions of the Meadowlands ecosystem and to the Hackensack River. On the other hand, the relatively stable conditions now prevailing in the Creek are neither causing nor threatening to cause harm. In these circumstances, New Jersey's dredging proposal would cause substantial detriments. Although many of these concerns were raised during the Berry's Creek Conference, New Jersey has not sought to address them. It carried out no geochemical study or other evaluation of the detriments of dredging. Indeed, it seems not to have considered in any respect the adverse effects of the work covered by its application.

Moreover, New Jersey has made no effort to define the benefits of the project, aside from the detriments. What is the rationale for the project? What is the specific risk of harm which is to be alleviated? Why is dredging necessary? Why did New Jersey propose a project of such large scope? Notably, there is no information whatsoever on the amount of mercury present in much of the sediment to be dredged.

Perhaps necessarily in light of the Corps' plenary authority over dredging and other work in navigable waters, the New Jersey courts have passed the entire set of questions regarding the need for and nature of work in Berry's Creek to the Corps for answers. This permit proceeding thus is a

federal offshoot of the New Jersey litigation, and accordingly has many attributes of a contested adjudication with the Corps cast in the role of the decision-maker. At this stage of the permit proceedings, the facts are only beginning to be developed. All one can be sure of now is that the facts available to date do not support New Jersey's application and that a full, fair and even-handed inquiry into New Jersey's proposal and other alternatives is essential.

March 1, 1982

A handwritten signature in black ink, appearing to read "Charles F. Lettow", with a stylized, flowing script.

Charles F. Lettow
Linda J. Soldo
COUNSEL FOR VENTRON

ADDENDA

Hackensack Meadowlands Development Commission

*Memorandum*TO Glen PaulsonFROM Chet MattsonDate December 4, 1978Subject Mercury

I enclose a copy of my memo to you of August 1, 1978, "Mercury Travel in Hackensack River Estuary." I will build on it in this memo.

On November 20, 1978, Paul Galluzzi and I toured the Berrys Creek Tide Basin with Mr. Joseph Bonanno and two of his employees. Mr. Bonanno, owner of a commercial dredging company, generously offered, at my personal request, his expert advise as to what would be entailed in a dredging program in the most contaminated segment of Berrys Creek--from the Paterson Plank Road Bridge at Berrys Creek northwards to the mercury dump site.

I arranged this tour on learning from Dave Lipsky that the court had expressed some interest in such an idea. I also communicated by phone, on November 21, 1978, to Dave Lipsky and Ron Hecksch, a brief sense of these, our conversations with Mr. Bonanno on November 20.

Based on our own knowledge and experience here with such matters, on our water quality and hydrology research in the Hackensack Estuary and Berrys Creek, on existing mercury data and on the preliminary results of the HMD/DEP mercury study to date, I propose the following dredging plan for upper Berrys Creek as a first step in decontaminating this waterway. Ron Hecksch said (on November 21, 1978) that he finds such a program interesting, and that he may even be interested in approaching the judge with the idea.

The program rests on: what size barges and dredges can navigate the shallow depths, narrow widths, and tidal patterns on Berrys Creek; where such equipment can be launched and operated; what types of dredges are best for the various physical conditions as well as for the types of contamination we are dealing with here; the distances that dredge spoil can be moved with the equipment that will fit the channels; and what spoil sites (location and size) we think can be contemplated and designed for the dredged, contaminated material.

1. We can put an 8" dredge on a barge into Berrys Creek at Berrys Creek and Paterson Plank Road using the Goodyear parking lot to launch. We will have to work on the tide, sitting on the bottom at low tide. No utility crossings occur in the Creek north of this point. The 8" dredge, on a shallow draft barge, draws not more than 5 to 6 feet.

2. We will need a spoils basin less than 1 mile from the 8" dredge head. I propose that we design a thick clay liner and berms to be perched atop the present mercury dump site. More on this below.

3. At Berrys Creek by Manhattan Products, we will have to widen the creek at this point, or dredge on tide at a time. --

4. Perhaps we could use an existing clay pit in Carlstadt for the first spoils dredged northward from the Paterson Plank Road Bridge across Berrys Creek. We have not determined how much space remains in this clay pit. There would be the matter of getting across an active rail spur for about 30 days.

5. At the tidegate (adjacent to mercury dump site), we can dredge that portion of the creek north of the tidegate from shore. Creek is not more than 75' here. Can reach across.

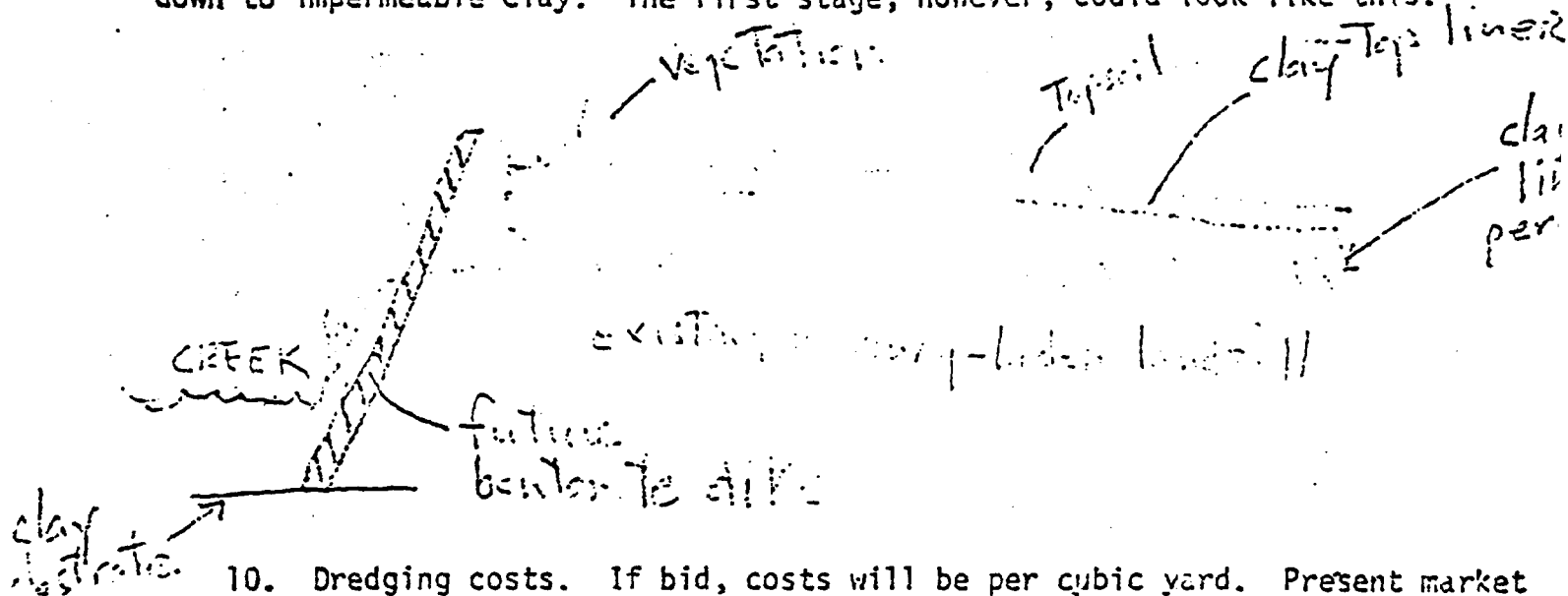
To the south of the tidegate, considerably wider, the ground here is too soft to use pads along the shore. Here we will have to work with a drag line placed on the barge. Spoils would be deposited into a barge, or placed directly ashore inside the clay-lined spoils basin.

6. The discharge water from the pumping station can be contained behind the tidegate, which, when repaired, will create a settling basin. This settling basin can then be periodically dredged of its contaminated, settled spoils.

7. We would design a clay lined spoils basin to be perched on top of mercury dump site. It would not be paved; rather it would have a level layer of clay on top, then a layer of soil and vegetation. Its design would be such that maximum evapotranspiration of rainfall would occur, reducing leachate formation. The top of the spoils site would be level, with no drainage swales leading to it from higher land at its perimeter. The water that falls stays and evapotranspires. Exterior (and surplus) runoff is diverted away from the mercury dump site. Thus we would try to design a perched spoils basin to handle as much of the rain from the sky as possible.

8. Regarding staging, we could dredge upstream, starting at Paterson Plank Road Bridge. An 8" dredge can pump its spoil not more than 1 mile. Could dredge on incoming tides only, with cutter head suction dredge. Any fugitive sediment particles, anticipatedly small in numbers, would thus settle upstream of the dredging operation, there to be picked up later. Winter dredging is recommended. Thus an early start is mandatory.

9. As a second stage, unless adequate monies were available from the beginning, the existing mercury dump site, with its clay enclosed perched spoils basin, would be surrounded by a bentonite (or concrete) barrier reaching down to impermeable clay. The first stage, however, could look like this.



10. Dredging costs. If bid, costs will be per cubic yard. Present market range is between \$1.00 and \$2.00 per cubic yard. Using the upper dollar range,

$$\frac{5,280' \text{ (of creek)} \times 100' \text{ wide} \times 1' \text{ deep}}{43,560} = 12.1 \text{ Acre feet of dredge s}$$

x 2' deep = 24.2 acre feet of spoil.

There are 1600 cubic yards per acre foot of spoil.

Mercury dump site is 19 acres.

$$24.2 \text{ acre. feet} \times 1600 = 38,720 \text{ cubic yards} \times \$2.00 = \$77,4$$

I have not calculated any costs for the clay basin. But you can see that there is room on the present mercury dump site to which we can return the worst of the bottom sediments as a first stage decontamination plan.

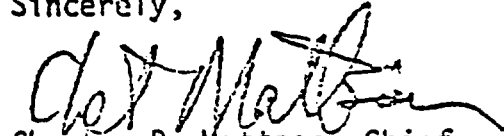
Glen Paulson
December 4, 1978
Page 4

What I am urging here is a first stage program which begins immediately. In no way do I minimize the importance or sealing the present dump site to prevent added migration of mercury into the Berrys Creek Basin. This will require either an impermeable dike which either completely seals the site--top, sides and bottom--or which has a vegetative evapotranspiration feature. I like the soil/vegetation top layer, because it permits us to deal with the fact that the landfill will settle over time, causing shifts in whatever top layer we enplace. Clay, covered by soil, bends. It can be sealed, topsoiled and vegetated again. Pavement, in contrast, would have to be repaired regularly over time, as we responded to cracking, freezing, etc. But these are preliminary thoughts.

Most importantly, to me, is the idea of finding a way to begin a decontamination program while the court case undergoes whatever appeals are contemplated.

What are your thoughts?

Sincerely,



Chester P. Mattson, Chief
Environmental Programs and Planning

CPM/jc

Enclosure